

APPLICANTS: Vladimir SHLAIN et al.  
SERIAL NO.: 10/026,886  
FILED: December 27, 2001  
Page 6

### **REMARKS**

The present response is intended to be fully responsive to all points of rejection raised by the instant Office Action, and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

### **Status of Claims**

Claims 1 – 13 are pending in the application and are rejected. Claims 1 – 3, 5, 6, 9, 10, 12, and 13 are amended herewith. Claim 7 has been cancelled without prejudice or disclaimer. New claim 14 has been added.

### **CLAIM REJECTIONS**

#### **35 U.S.C. § 101 Rejections**

Claims 1 – 13 have been rejected under 35 U.S.C. §101, as being directed to non-statutory subject matter. Applicant respectfully traverses the rejection of claims 1-13 in view of the remarks that follow.

The Office Action asserts that claims 1 – 13 are not limited to practical applications in the technological arts and fail to define a statutory specific machine disclosed within the specification.

Claims 1 and 2 have been amended to include the term “computer-implemented” in connection with claim elements, although it is completely and utterly understood by persons of ordinary skill in the art of Automatic Defect Classification that such techniques are and can only be implemented by a computer. Thus, the mere mention of an Automatic Defect Classification method to the person of ordinary skill in the art does not require further explanation that the method is to be implemented using a computer. Nonetheless, page 14 of the specification, last paragraph, clearly states “that the methods and apparatus described herein may be readily implemented in computer hardware or

APPLICANTS: Vladimir SHLAIN et al.  
SERIAL NO.: 10/026,886  
FILED: December 27, 2001  
Page 7

software using conventional techniques,” and such reference to computer implementation also appears in numerous locations in the provisional patent application incorporated by reference.

Claims 1 – 3, 5, 6, 9, 10, 12, and 13 have been further amended to limit their practical application to processing and classifying defect images. Applicant submits that limiting the claims to processing defect images “manipulates data representing physical objects to achieve a practical application” as indicated in Box 12 of the USPTO Examination Procedure Flowchart for Computer-Related Inventions

Claims 1 – 13 thus recite a practical application in the technological arts in that computer-based Automatic Defect Classification is critical to modern manufacturing techniques, such as in the field of semiconductor fabrication. In Gottschalk v. Benson the Court emphasized that transformation and reduction of an article “to a different state or thing” is the clue to the patentability of a process claim that does not include particular machines. By deriving the classification of defect images of manufactured articles, data is indeed transformed from one state to a more useful state, as defect classification often plays a key role in manufacturing quality control.

In view of the above, Applicant respectfully submits that claims 1 – 13 are directed to statutory subject matter, and are therefore deemed allowable. Applicant therefore requests that the rejection of claims 1 – 13 under 35 U.S.C. §101 be withdrawn.

### **35 U.S.C. § 102 Rejections**

Claims 1 – 3, 5 – 10, and 12 - 13 have been rejected under 35 U.S.C. §102(b), as being anticipated by “DCS-1: A Fuzzy Logic Expert System for Automatic Defect Classification of Semiconductor Wafer Defects” to Luria, et al. (hereinafter “Luria”). Applicant respectfully traverses the rejection in view of the remarks that follow.

Claim 1 as amended recites (emphasis added):

A system for automatic defect classification comprising:

APPLICANTS: Vladimir SHLAIN et al.  
SERIAL NO.: 10/026,886  
FILED: December 27, 2001  
Page 8

computer-implemented means for applying a plurality of binary rules to a defect image, wherein any of said binary rules is operative to classify said defect image to one class of a class pair taken from a plurality of class pairs; and

computer-implemented means for determining to which of said classes said defect image is classified the greatest number of times subsequent to the application of said binary rules.

Applicant respectfully submits that Luria does not teach the application of “binary” rules, nor that defect images are classified to “to one class of a class pair taken from a plurality of class pairs.” In Luria, every rule is mapped to a class (see page 2101, lines 6-7 and page 2103, paragraph 5.4, lines 1-3). However, claim 1 recites that binary rules are used in which every rule is mapped to one class within a pair of classes taken from a plurality of class pairs. Furthermore, every rule in Luria classify objects to one class of N classes. The possible number of such pairs of the claimed invention is formed from N classes as  $N*(N-1)/2$ . Thus, the invention of claim 1 uses  $N*(N-1)/2$  binary rules for N classes, whereas Luria uses N rules for N classes. Applicant submits that the claimed invention represents a major gain in simplicity and effectiveness of the rules over Luria.

Given the above, Luria evaluates N rules for N classes, whereas, in the invention of claim 1  $N*(N-1)/2$  binary rules for N classes are evaluated. Thus, the “means for determining” in Luria are essentially different from “means for determining” in claim 1.

In view of the above, Applicant respectfully submits that claim 1 is not anticipated by Luria, and is therefore deemed allowable. Claims 2 –6 and 8 depend directly or indirectly from independent claim 1, and are, *a fortiori*, deemed allowable. Claim 7 has been cancelled without prejudice or disclaimer. Claim 9, including the elements of claim 1 recited in method form, is likewise deemed allowable. Claims 10 and 12 – 13 depend directly or indirectly from independent claim 9, and are, *a fortiori*, deemed allowable. Applicant therefore requests that the rejection of claims 1 – 3, 5 – 6, 8 – 10, and 12 - 13 under 35 U.S.C. §102 be withdrawn.

APPLICANTS: Vladimir SHLAIN et al.  
SERIAL NO.: 10/026,886  
FILED: December 27, 2001  
Page 9

### 35 U.S.C. § 103 Rejections

Claims 1 – 13 have been rejected under 35 U.S.C. §103(a), as being unpatentable over “Automated Feature Extraction for Supervised Learning. NASA Ames Research Center, Moffett Field, CA 94035-1000 (U.S.A.), © 1994 IEEE” to Laird, et al. (hereinafter “Laird”) in view of Luria. Applicant respectfully traverses the rejection in view of the remarks that follow.

The classification rules described in Laird, are related to the so called decision-tree classification method, where feature value diapasons are divided into non-intersecting intervals for a sequence of features until a class label is unambiguously determined from a set of class labels. Thus, in Laird application of a binary rule is related to one of a pair of feature value diapasons.

In contrast, claim 1 of the invention applies binary rules with respect to “one of a pair of classes” which refers to one of a pair of classes (class labels) to be determined as target classes of the classification process. Claim 1 classifies defects to one of a pair of classes as target classes. This feature is not found in either Luria or Laird.

In view of the above, Applicant respectfully submits that claim 1 is not unpatentable over Laird in view of Luria, and is therefore deemed allowable. Claims 2 – 6 and 8 depend directly or indirectly from independent claim 1, and are, *a fortiori*, deemed allowable. Claim 7 has been cancelled without prejudice or disclaimer. Claim 9, including the elements of claim 1 recited in method form, is likewise deemed allowable. Claims 10 and 12 – 13 depend directly or indirectly from independent claim 9, and are, *a fortiori*, deemed allowable. Applicant therefore requests that the rejection of claims 1 – 3, 5 – 6, 8 – 10, and 12 - 13 under 35 U.S.C. §103 be withdrawn.

### Conclusion

Applicant respectfully submits that entry of the instant amendment and consideration of the above remarks renders the present application in condition for allowance, which action Applicant respectfully solicits.



APPLICANTS: Vladimir SHLAIN et al.  
SERIAL NO.: 10/026,886  
FILED: December 27, 2001  
Page 10

**Petition For One-Month Extension Of Time Under 37 CFR 1.136(a)**

The period for responding to the instant Office Action was set to expire on April 24, 2005. Applicant hereby requests that the period for responding to the instant Office Action be extended by one (1) month, so as to expire on May 24, 2005. Accordingly, this response is being timely filed.

The fee for a Petition for a One-Month Extension of Time is Sixty Dollars (\$60.00) dollars for a small entity. No additional fees are believed due. The United States Patent and Trademark Office is hereby authorized to charge Deposit Account 501380 in the amount of \$60.00 and any additional fee which is necessary in connection with the filing of this petition and response.

Favorable action on this amendment and petition is courteously solicited.

Respectfully submitted,

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